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EXAMINER

HARVEY, DIONNE

ART UNIT

PAPER NUMBER

2643

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/409,163

Applicant(s)

Gao

Examiner

Dionne Harvey

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 16-49, and 52-56 is/are rejected.
- 7) ☒ Claim(s) 13-15, 50, and 51 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 5 6 6) ☐ Other:

Art Unit: 2643

## **DETAILED ACTION**

### ***Drawings***

1. Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “audio amplification device” of claim 1, must be shown and labeled or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 U.S.C. § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2643

3. Claims 1,2,25,39,48,49,53 and 55 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The cited claims recite an "audio amplification device". The elements which constitute said "audio amplification device" have not been clearly defined by the specification.

***Claim Rejections - 35 U.S.C. § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3,6-8,24,25,34,35-39 and 47 are rejected under 35 U.S.C. 102(b) as being anticipated by Reames (US 5,748,752).

Regarding claims 1 and 25, in figure 5, Reames teaches a feedback canceler for an audio amplification device comprising: an adaptive filter (58); means for combining(60) an output of the adaptive filter(58) with an input of the audio amplification device; and a first band limiting filter (56) having an input coupled to an output of the audio amplification device and an output coupled

Art Unit: 2643

to the input of the adaptive filter (58), wherein the first band limiting filter has a pass band limited to a frequency band containing unstable frequencies, as broadly claimed (col. 5, lines 38-44).

Regarding claim 2, Reames teaches an amplifier (62) for aiding hearing.

Regarding claim 3, Reames teaches digital implementation (figure 4).

Regarding claim 6, Reames teaches that the first band limiting filter is digitally implemented (720).

Regarding claim 7, Reames teaches that the first band limiting filter comprises a high pass filter (column 4, lines 45-58).

Regarding claim 8, Reames teaches that the high pass filter cut off is approximately 200 Hz below the lowest unstable frequency, as broadly claimed.

Regarding claim 24, Reames teaches that the first band limiting filter(56) has a frequency response approximately matching a frequency response of a feedback path, as broadly claimed.

Regarding claim 34, Reames teaches that the audio amplification device comprises a hearing aid amplifier (62).

Regarding claim 36, Reames teaches that the first band limiting filter comprises a high pass filter (column 4, lines 45-58).

Regarding claim 37, Reames teaches that the high pass filter cut off is approximately 200 Hz below the lowest unstable frequency, as broadly claimed.

Regarding claim 38, Reames teaches means for delaying (56) the output of the audio amplification prior to the first band limiting filter (56).

Art Unit: 2643

Regarding claim 39, Reames teaches that the audio amplification device is delayed by an amount of time that is a function of the feedback path, as broadly claimed.

Regarding claim 47, Reames teaches that the first band limiting filter(56) has a frequency response approximately matching a frequency response of a feedback path.

***Claim Rejections - 35 U.S.C. § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4,5,9-12,16,17,20-23,31-33,35,43-46 and 52-55 are rejected under 35 U.S.C.

103(a) as being unpatentable over Reames (US 5,748,752) in view of Soli et al. (EP 579,152 A1).

Regarding claim 4, Reames does not specifically teach that the adaptive filter is a finite impulse response (FIR) filter. Soli teaches a device for noise and feedback suppression wherein the adaptive filter (510) is implemented as a finite impulse response filter. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Reames and Soli, thereby using a FIR filter, since an FIR filter does not accumulate errors, requires fewer bits and is a wide-band filter having unconditional stability due to it's lack of poles.

Art Unit: 2643

Regarding claim 5, Soli teaches that the adaptive filter is implemented with a normalized least mean square algorithm (column 8, lines 34-50).

Regarding claim 9, Soli teaches that the adaptive filter comprises means for convolving the input of the adaptive filter with filter coefficients (column 8, lines 23-33).

Regarding claim 10, Soli teaches that the adaptive filter further comprises means for applying a scaling gain (block 450 in figure 2) to the filter coefficients.

Regarding claims 11 and 12, Soli teaches that the scaling gain is in the range of  $2^{-3}$  to  $2^3$ .

Regarding claim 16, Soli teaches means for delaying (1710 in figure 7) the output of the audio amplification prior to the first band limiting filter (1720).

Regarding claim 17, Soli teaches that the audio amplification device is delayed by an amount of time that is a function of the feedback path (550, 570).

Regarding claims 20 and 21, Soli teaches that the adaptive filter has an adjustable adaptation speed (columns 7-8) as a function of the gain via sample period.

Regarding claim 22 and 23, Soli teaches that the adaptation length is selectable via algorithm implementation.

Regarding claim 31, Soli teaches that the adaptive filter further comprises means for applying a scaling gain (block 450 in figure 2) to the filter coefficients.

Regarding claims 32 and 33, Soli teaches that the scaling gain is in the range of  $2^{-3}$  to  $2^3$ .

Art Unit: 2643

Regarding claim 35, Soli teaches measuring adaptive coefficients while in the ear of the user to identify unstable frequencies.

Regarding claims 43,44,53 and 55, Soli teaches that the adaptive filter has an adjustable adaptation speed (columns 7-8) as a function of the gain via sample period.

Regarding claim 45 and 46, Soli teaches that adaptation length is selectable as a function of sampling rate and frequency band containing unstable frequencies via algorithm implementation.

Regarding claims 52 and 54, Soli teaches means for storing filter coefficients for the first band limiter in delay line (420).

6. Claims 18, 19 and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reames (US 5,748,752) in view of Williamson (US 5,027,410).

Regarding claims 18, 19, 40-42, Reames does not specifically teach that an AGC is coupled before the means for combining(60) such that the AGC output is combined with the output of the combination step. In column 7, lines 39-53, Williamson teaches that an AGC may be implemented as a pre-emphasis step before the means for combining a feedback cancellation circuit. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Reames and Williamson for the purpose of reducing the high frequency content of the signal to minimize aliasing.



Art Unit: 2643

7. Claims 26-30 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reames (US 5,748,752) in view of Soli et al. (EP 579,152), and further in view of Tzeng (US 5,142,552).

Regarding claim 26, Reames does not teach that the adaptive filter is implemented by the method as claimed. In figure 8, Soli teaches estimating a cancellation error signal (550) and adapting the filter coefficients in accordance; band pass filtering the adapted coefficients(730) and applying the adapted coefficients to an adjustable filter (510). Soli does not specifically teach removing a DC offset from the adapted filter coefficients. Tzeng teaches the importance of removing DC offset from data information in a voice network. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Reames, Soli and Tzeng thereby preventing the introduction of errors during decoding of information signals in the signal processor.

Regarding claim 27, the combination of Reames, Soli and Tzeng teach removing the DC offset less frequently than adapting filter coefficients. Soli teaches a continuous adaptation of filter coefficients while Tzeng teaches eleven taps wherein the eleventh tap is for correcting DC offset.

Regarding claim 28, Soli teaches bandpass filtering at a predetermined threshold via noise probe (670).

Art Unit: 2643

Regarding claim 29, Soli teaches that those skilled in the art will recognize that other algorithms could be used and therefore does not restrict to multiplication while adapting filter coefficients.

Regarding claim 30, Tzeng teaches that the adaptive filter comprises means for convolving the input of the adaptive filter with filter coefficients (column 8, lines 23-33).

Regarding claim 56, Reames teaches that the passband is limited to a frequency band containing unstable frequencies (col. 5, lines 38-44).

#### *Allowable Subject Matter*

8. Claims 13-15, 50 and 51 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### *Conclusion*

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statements for Allowance."

Art Unit: 2643

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne Harvey whose telephone number is (703) 305-1111. The examiner can normally be reached on Monday through Friday from 8:30am to 6:00pm.

**Any responses to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, DC 20231

**or faxed to:**

(703) 308-6306, for formal communications for entry

**Or:**

(703) 308-6296, for informal or draft communications, please label "PROPOSED" or "DRAFT".

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor(Receptionist)

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz, can be reached at (703) 305-4708.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dionne Harvey whose telephone number is (703) 305-1111.

D.H.

July 24, 2003

  
CURTIS KUNTZ  
SUPERVISORY PATENT EXAMINER  
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